The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An internal combustion engine comprising:

(a) a housing;

(b) a piston assembly disposed in the housing, wherein the piston assembly is substantially stationary relative to the housing;

(c) a cylinder movably disposed within the housing; and

(d) a combustion chamber disposed between the piston assembly and the cylinder.

2. The internal combustion engine of Claim 1, wherein the cylinder reciprocates relative to the piston assembly and within the housing during operation of the internal combustion engine.

3. The internal combustion engine of Claim 2, wherein the piston assembly is at least partially disposed within a piston liner.

4. The internal combustion engine of Claim 1, wherein the piston assembly is adjustably coupled to the housing.

5. The internal combustion engine of Claim 4, further comprising a compression ratio adjustment mechanism in communication with the piston assembly and adapted to adjust a compression ratio of the internal combustion engine during operation by moving the piston assembly.

6. The internal combustion engine of Claim 5, wherein the compression ratio adjustment mechanism is adapted to increase the compression ratio when an operating speed of the internal combustion engine is less than a selected operating speed.

7. The internal combustion engine of Claim 5, wherein the compression ratio adjustment mechanism is adapted to increase the compression ratio when an operating speed of the internal combustion engine is more than a predetermined operating speed.

8. The internal combustion engine of Claim 1, further comprising an exhaust gas recovery chamber disposed between the cylinder and the housing, the exhaust gas recovery chamber adapted to receive exhaust gases to permit the exhaust gases to expand to aid in the movement of the cylinder.

9. The internal combustion engine of Claim 8, further comprising a recovery valve in communication with the exhaust gas recovery chamber, the recovery valve movable between a first position and a second position.

10. The internal combustion engine of Claim 9, wherein when the recovery valve is in the first position, exhaust gas flows into the exhaust gas recovery chamber to aid in the movement of the cylinder.

11. The internal combustion engine of Claim 9, wherein when the recovery valve is in the second position, exhaust gas flow into the exhaust gas recovery chamber is impeded.

12. The internal combustion engine of Claim 9, wherein the recovery valve is a rotary valve.

13. The internal combustion engine of Claim 1, wherein the cylinder is coupled to a crankshaft.

14. The internal combustion engine of Claim 13, wherein the cylinder is coupled to a first portion of the crankshaft, wherein during operation the first portion of

the crankshaft is displaced along a linear path to move the cylinder along a predetermined stroke length.

15. The internal combustion engine of Claim 14, wherein the first portion of the crankshaft simultaneously rotates as it is displaced along the linear path.

16. The internal combustion engine of Claim 1, further comprising a fuel injection device disposed at least partially within the piston assembly, the fuel injection device adapted to discharge fuel into the cylinder.

17. The internal combustion engine of Claim 1, further comprising an exhaust valve disposed within the housing for selectively sealing an exhaust port located in the combustion chamber.

18. The internal combustion engine of Claim 17, further comprising a fuel injection device disposed at least partially within the piston assembly, the fuel injection device adapted to direct at least a portion of fuel discharged from the fuel injection device toward the exhaust valve.

19. The internal combustion engine of Claim 1, wherein the internal combustion engine is a diesel internal combustion engine.

20. The internal combustion engine of Claim 1, wherein the internal combustion engine is a gasoline internal combustion engine.

21. The internal combustion engine of Claim 1, further comprising;

(a) an additional piston assembly coupled to the housing; and

(b) a first chamber disposed in the cylinder for at least partially receiving the piston assembly and a second chamber disposed in the cylinder for at least

partially receiving the additional piston assembly, wherein the cylinder is disposed within the housing for reciprocal movement between the piston assemblies.

22. The internal combustion engine of Claim 1, further comprising a spark plug disposed at least partially within the piston assembly.

23. An internal combustion engine comprising:

(a) a housing;

(b) a piston assembly disposed in the housing;

(c) a cylinder movably disposed within the housing; and

(d) an exhaust gas recovery chamber disposed between the cylinder and the housing, the exhaust gas recovery chamber adapted to receive exhaust gases produced in the internal combustion engine to aid in moving the cylinder.

24. The internal combustion engine of Claim 23, further including a recovery valve in communication with the exhaust gas recovery chamber, the recovery valve movable between a first position and a second position.

25. The internal combustion engine of Claim 24, wherein when the recovery valve is in the first position, the exhaust gas recovery chamber receives exhaust gases to aid in the movement of the cylinder.

26. The internal combustion engine of Claim 24, wherein when the recovery valve is in the second position, the exhaust gas recovery chamber is impeded from receiving exhaust gases from the internal combustion engine.

27. The internal combustion engine of Claim 24, wherein the recovery valve is a rotary valve.

28. The internal combustion engine of Claim 23, wherein the internal combustion engine is a diesel internal combustion engine.

29. The internal combustion engine of Claim 23, wherein the internal combustion engine is a gasoline internal combustion engine.

30. An internal combustion engine comprising:

(a) a housing;

(b) a piston assembly disposed in the housing;

(c) a cylinder movingly disposed within the housing; and

(d) a waste gate valve in fluid communication with the cylinder, the waste gate valve moveable to a release position in which exhaust gases produced in the cylinder are directed to be released from the internal combustion engine and a closed position in which the exhaust gases are impeded from being released from the internal combustion engine.

31. The internal combustion engine of Claim 30 further including a waste gate valve actuation system adapted to move the waste gate valve between the release and closed positions based upon an operational speed of the internal combustion engine.

32. The internal combustion engine of Claim 30, further including a waste gate valve actuation system adapted to move the waste gate valve between the release and closed positions based upon a power setting of the internal combustion engine.

33. The internal combustion engine of Claim 30, further including a waste gate valve actuation system adapted to move the waste gate valve between the release and closed positions based upon both a power setting of the internal combustion engine and an operational speed of the internal combustion engine during operation.

34. The internal combustion engine of Claim 30, wherein the internal combustion engine is a diesel internal combustion engine.

35. The internal combustion engine of Claim 30, wherein the internal combustion engine is a gasoline internal combustion engine.

36. An diesel internal combustion engine comprising:

(a) a housing;

(b) a piston assembly disposed in the housing, the piston assembly substantially stationary relative to the housing;

(c) a cylinder movably disposed within the housing;

(d) a combustion chamber disposed between the piston assembly and the cylinder; and

(e) a fuel injection device disposed in the housing and adapted to inject fuel into the combustion chamber.

37. The diesel internal combustion engine of Claim 36, wherein the fuel injection device is at least partially disposed in the piston assembly.

38. The diesel internal combustion engine of Claim 36, wherein the piston assembly is at least partially disposed within a piston liner.

39. The diesel internal combustion engine of Claim 36, wherein the piston assembly is adjustably coupled to the housing.

40. The diesel internal combustion engine of Claim 39, further comprising a compression ratio adjustment mechanism in communication with the piston assembly and adapted to adjust a compression ratio of the diesel internal combustion engine during operation by moving the piston assembly.

41. The diesel internal combustion engine of Claim 36, further comprising an exhaust gas recovery chamber disposed between the cylinder and the housing, the exhaust gas recovery chamber adapted to receive exhaust gases produced in the diesel internal combustion engine to aid in moving the cylinder.

42. The diesel internal combustion engine of Claim 41, further comprising a recovery valve in communication with the exhaust gas recovery chamber, the recovery valve movable between a first position and a second position.

43. The diesel internal combustion engine of Claim 42, wherein when the recovery valve is in the first position, exhaust gas flows into the exhaust gas recovery chamber to aid in the movement of the cylinder.

44. The diesel internal combustion engine of Claim 42, wherein when the recovery valve is in the second position, exhaust gas flow into the exhaust gas recovery chamber is impeded.

45. The diesel internal combustion engine of Claim 36, wherein the cylinder is coupled to a first portion of the crankshaft, wherein during operation, the first portion of the crankshaft is displaced along a linear path to move the cylinder along a predetermined stroke length.

46. The diesel internal combustion engine of Claim 45, wherein the first portion of the crankshaft simultaneously rotates as it is displaced along the linear path.

47. The diesel internal combustion engine of Claim 36, further comprising;

(a) an additional piston assembly coupled to the housing; and

(b) a first chamber disposed in the cylinder for at least partially receiving the piston assembly and a second chamber disposed in the cylinder for at least

partially receiving the additional piston assembly, wherein the cylinder is disposed within the housing for reciprocal movement between the piston assemblies.